

**Translation**

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>2003.0006PWO</b>		<b>FOR FURTHER ACTION</b>	See Form PCT/IPEA/416
International application No. <b>PCT/DE2004/000620</b>	International filing date (day/month/year) <b>24.03.2004</b>	Priority date (day/month/year) <b>24.03.2003</b>	
International Patent Classification (IPC) or national classification and IPC			
Applicant <b>SIRONA DENTAL SYSTEMS GMBH</b>			

  

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.	
2. This REPORT consists of a total of <u>14</u> sheets, including this cover sheet.	
3. This report is also accompanied by ANNEXES, comprising:	
a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>4</u> sheets, as follows:	
<input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).	
<input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.	
b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).	
4. This report contains indications relating to the following items:	
<input checked="" type="checkbox"/> Box No. I	Basis of the report
<input type="checkbox"/> Box No. II	Priority
<input type="checkbox"/> Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input checked="" type="checkbox"/> Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/> Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/> Box No. VI	Certain documents cited
<input checked="" type="checkbox"/> Box No. VII	Certain defects in the international application
<input type="checkbox"/> Box No. VIII	Certain observations on the international application

  

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

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## Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-16 \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the claims:
- nos. \_\_\_\_\_ as originally filed/furnished
- nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19  
25.01.2005 with the
- nos.\* 1-16 \_\_\_\_\_ received by this Authority on letter of 24.01.2005
- nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the drawings:
- sheets 1/6-6/6 \_\_\_\_\_ as originally filed/furnished
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. IV Lack of unity of invention

1. ☐ In response to the invitation to restrict or pay additional fees the applicant has:
  - ☐ restricted the claims.
  - ☐ paid additional fees.
  - ☐ paid additional fees under protest.
  - ☐ neither restricted the claims nor paid additional fees.
2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is:
  - ☐ complied with.
  - ☒ not complied with for the following reasons:
4. Consequently, this report has been established in respect of the following parts of the international application:
  - ☐ all parts.
  - ☐ the parts relating to claims Nos. \_\_\_\_\_

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	1-9, 11, 13, 14, 16	YES
	Claims	10, 12, 15	NO
Inventive step (IS)	Claims	9, 11, 13, 14	YES
	Claims	1-8, 10, 12, 15, 16	NO
Industrial applicability (IA)	Claims	1-9, 10-16	YES
	Claims		NO
2. Citations and explanations (Rule 70.7)			
	This report makes reference to the following documents:		
	D2: EP 1 219 244 A2		
	D4: US2003/030721 A1		
1.	The present application does not meet the requirements of PCT Article 33(1) because the subject matter of claims 1-8 does not involve an inventive step within the meaning of PCT Article 33(3).		
	D2 discloses (the references in parentheses are to this document) an x-ray device according to the preamble of claim 1 (cf. figures 1, 2 or 6 and paragraphs 0011, 0012 and 0019).		
	Further, D2 discloses the use for panoramic tomography of one or a plurality of planar (or wider than 30 x 20 mm <sup>2</sup> ) sensors to generate multiple transverse tomograms calculated by a computing unit from signals from the planar sensor(s) (see paragraphs 20-29) instead of the		

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known elongated line sensor (135-180 mm x 6 mm).

Thus, D2 discloses an x-ray-sensitive camera with a first and a second image detector and with means for calculating multiple two-dimensional images (PC computing unit 29, software 27).

D2 further discloses adjustment means (figure 2, stepping motor 9, spindle 10 and paragraph 12), by means of which the camera is adjustable such that the second image detector provided in the camera can be brought into the ray path of the x-ray source. Although means for generating three-dimensional images are not explicitly mentioned in D2, these are considered obvious in light of the evaluating computer and software disclosed (paragraphs 25-30).

Thus, although the subject matter of claim 1 is novel over the disclosure of D2 within the meaning of PCT Article 33(2), it does not involve an inventive step within the meaning of PCT Article 33(3).

2. D4 likewise discloses an x-ray device with an x-ray-sensitive camera (figure 2, 5) for generating tomograms (paragraphs 57-60) which has a first image detector (figure 3B, 20) for generating panoramic images and a second image detector (figures 3B and 4, sensor 20') for generating two-dimensional images (paragraphs 71 and 72).

Adjusting means for adjusting the camera are

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likewise mentioned in D4 (paragraph 60: scanning movement of the sensors when radiation source and object are held stationary ... the modules moving synchronised ... the modules 20, 20' pass the object ...). D4 likewise mentions adjustment of the primary diaphragm of the x-ray source (paragraph 60: scanning movement of the beam is implemented by collimators).

D4 does not explicitly disclose means for generating three-dimensional images. Therefore, the subject matter of claim 1 is also novel over the disclosure of D4 (PCT Article 33(2)). However, in light of the calculating means also mentioned in D4 such means seem obvious to a person skilled in the art of evaluating digital x-ray sensor data (paragraph 68).

Therefore, the subject matter of claim 1 also lacks inventive step over D4 within the meaning of PCT Article 33(3).

3. Dependent claims 2-8 do not contain any features which, in combination with the features of any claim to which they refer back, meet the PCT requirements for inventive step ((see D2 or D4 [*inter alia* paragraph 75] and the corresponding passages indicated in the search report). In particular, a surface sensor (claim 2) is explicitly mentioned in D2 (for example, in paragraph 15) and D4 (paragraphs 58-65) and the corresponding imaging techniques according to

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	<p>claims 3-8 follow in an obvious manner from the above-indicated passages in D2 (see also paragraphs 19-24) or D4.</p> <p>4. The further details of the adjustment means on the camera support according to claim 9 do not follow in a directly obvious manner from the citations indicated.</p> <p>Therefore, claim 9 meets the requirements of PCT Article 33(2) and (3).</p> <p>The subject matter of claims 1-9 is evidently industrially applicable and therefore meets the requirements of PCT Article 33(4).</p> <p>5. As mentioned in Box IV, independent claims 1 and 10 do not comply with PCT Rule 13 in regard to the alternative embodiment in which the adjusting means are not part of the camera.</p> <p>Claims 10, 12, 15 and 16 appear to be obvious in light of the disclosure of D2 and D4 in regard to the alternative embodiment in which the adjusting means are part of the camera.</p> <p>D4 discloses an x-ray-sensitive camera (figure 2, 5) comprising a first x-ray-sensitive image detector (figure 3B, 20) for generating a tomogram (paragraphs 57-60). Further, D4 provides a second x-ray-sensitive image detector for generating two-dimensional images (figure 3B, sensor 20',</p>

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paragraph 60, figure 4 and paragraphs 71 and 72). Further, according to D4 the two image detectors are arranged in a common housing (see figure 2) and are arranged laterally side-by-side (see figures 2 and 3) and adjusting means are likewise present in order optionally to bring the first or the second image detector into alignment (not "equipment" [*Ausrüstung*] as printed) with an x-ray source (see figure 1 and paragraph 60, "the modules moving ..."), as mentioned above. Claim 10 does not specify sufficiently clearly that these adjusting means adjust the image detector inside the camera, which is not disclosed in D4.

Similarly, D2, as mentioned above, also discloses at least two image detectors arranged "laterally" side-by-side in a common housing and adjustment means are also provided. Without a defined reference direction, "laterally" is not considered sufficiently clear in this context to establish an adequately clear difference over the disclosures of D4 or D2; a similar conclusion applies to the adjusting means which are "provided".

Therefore, the subject matter of claim 10 does not appear to be novel (PCT Article 33(2)).

6. The further features of claims 12 and 15 are also known from D4 within the meaning of PCT Article 33(2) (retrofittability: paragraph 65, region permeable to rays: paragraph 57).



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The subject matter of claim 16 (position of the region of the camera permeable to rays) is not explicitly indicated in D4, but seems obvious (PCT Article 33(3)) in light of the disclosure of D4 (paragraph 57) in regard to x-rays.

7. The further features of claims 11, 13 and 14 are known neither from D4 nor from D2. The arrangement of the image detectors in a rear face-to-rear face manner according to claim 11 also appears to be non-obvious in light of D4, since this is inconsistent with the aim, according to D4, of distributed sensors (the very broad interpretation of the wording "laterally beside" evidently intended in claim 10 is assumed here, since a narrow interpretation would be inconsistent with claim 11).

In particular, the arrangement of the adjustment means in the camera according to claims 13 and 14 is neither known from D4 nor seems to follow therefrom in an obvious manner in light of the teaching of D4 concerning the use at the same time of multiple sensors in a scanning procedure or the necessity described therein to reconnect the camera for different types of x-ray images, for example, Pan or Ceph images. Therefore, claims 11, 13 and 14 meet the requirements of PCT Article 33(2) and (3).

8. The subject matter of claims 10-16 is also evidently industrially applicable within the

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meaning of PCT Article 33(4).

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Box No. VII

Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

1. Claims 1 and 10 have been duly drafted in the two-part form, but the features of the first and second image detectors and the adjustment means should not have been included in the characterizing part, since they were disclosed in D2 (and also in D4) in conjunction with the features indicated in the preamble (PCT Rule 6.3(b)).

Contrary to PCT Rule 5.1(a)(ii), the description does not cite D2 and D4 or indicate the relevant prior art disclosed therein.

The description is not consistent with the claims (PCT Rule 5.1(a)(iii)).

## Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: IV

**Lack of unity of invention**

This Authority has determined that the present international application contains multiple (groups of) inventions which are not linked by a single general inventive concept (PCT Rule 13.1), as follows:

- I: Claims 1-9 pertain to an x-ray device with an x-ray-sensitive camera with a first image detector for generating tomograms and a second image detector for generating two-dimensional images, wherein means for creating three-dimensional images of a partial volume of the mandibular arch and adjustment means are provided. Numerous alternative embodiments of said adjustment means are claimed, but not necessarily **for adjusting the image detector in the camera** in all cases.
- II: Claims 10-16 pertain to an x-ray-sensitive camera comprising a first x-ray-sensitive image detector for generating a tomogram and optionally a second x-ray-sensitive image detector for generating two-dimensional images, wherein both image detectors are arranged in a common housing. According to claim 11, the second image detector is arranged on the rear face of the first image detector, contrary to claim 10 (lateral arrangement side-by-side), and the second image detector is likewise evidently optional since, according to claim 12, it is **retrofittable**: that is, it is not obligatorily contained in the

## Supplemental Box

camera as per claim 10. Further, adjustment means are provided in the camera in order optionally to bring the first or, if present (see claim 12), the second image detector into appropriate alignment with an x-ray source.

Thus, the sole feature obligatorily shared by the two groups of claims is an x-ray-sensitive camera with a first image detector for generating tomograms. However, such a camera is sufficiently well known from the prior art indicated in the search report (see EP 1 219 244 A2 (D2), which shows a first and even a second image detector, or US 2003/030721 A1 (D4)) and from the introductory part of the description in the present application, as the inclusion in the preambles of claims 1 and 10 of this sole feature obligatorily shared by the two groups of claims makes clear.

Although both groups of claims pertain to the problem of producing tomograms and two-dimensional images, the second x-ray-sensitive image detector required therefor is, as claim 12 shows, not an obligatory feature of the camera according to claim 10. Even if, by rewording, said second image detector were to be considered a definitive feature shared by the two groups of claims, it could not be considered a special technical feature within the meaning of PCT Rule 13.2 since it is already known. The adjustment means for positioning the receivers in or on the camera according to claims 10-16 are, as stated above, not an obligatory feature of the

## Supplemental Box

x-ray device according to claims 1-9 and therefore cannot be considered a special technical feature shared by the two groups of claims within the meaning of PCT Rule 13.2. This applies only to the first two alternatives in claim 1 (adjustment means whereby the camera or the image detector can be brought into the ray path).

Therefore, no technical relationship involving one or more of the same or corresponding special technical features can be detected in the wording of independent claims 1 and 10. A feature common to the two claims over and above those known from the prior art indicated above cannot be discerned between a "means for recording three-dimensional images" and a "second x-ray-sensitive image detector" for generating another type of x-ray image (PCT Rule 13.2).